**Federal
Engineering**®

Montana
Comprehensive
Telecommunications
Plan

Executive Summary

December 1998

Prepared for:

Information Services Division
State of Montana
125 N. Roberts, Mitchell Building
Helena, MT   59620-0113

"Unleashing the Power of Technology"

TABLE OF CONTENTS
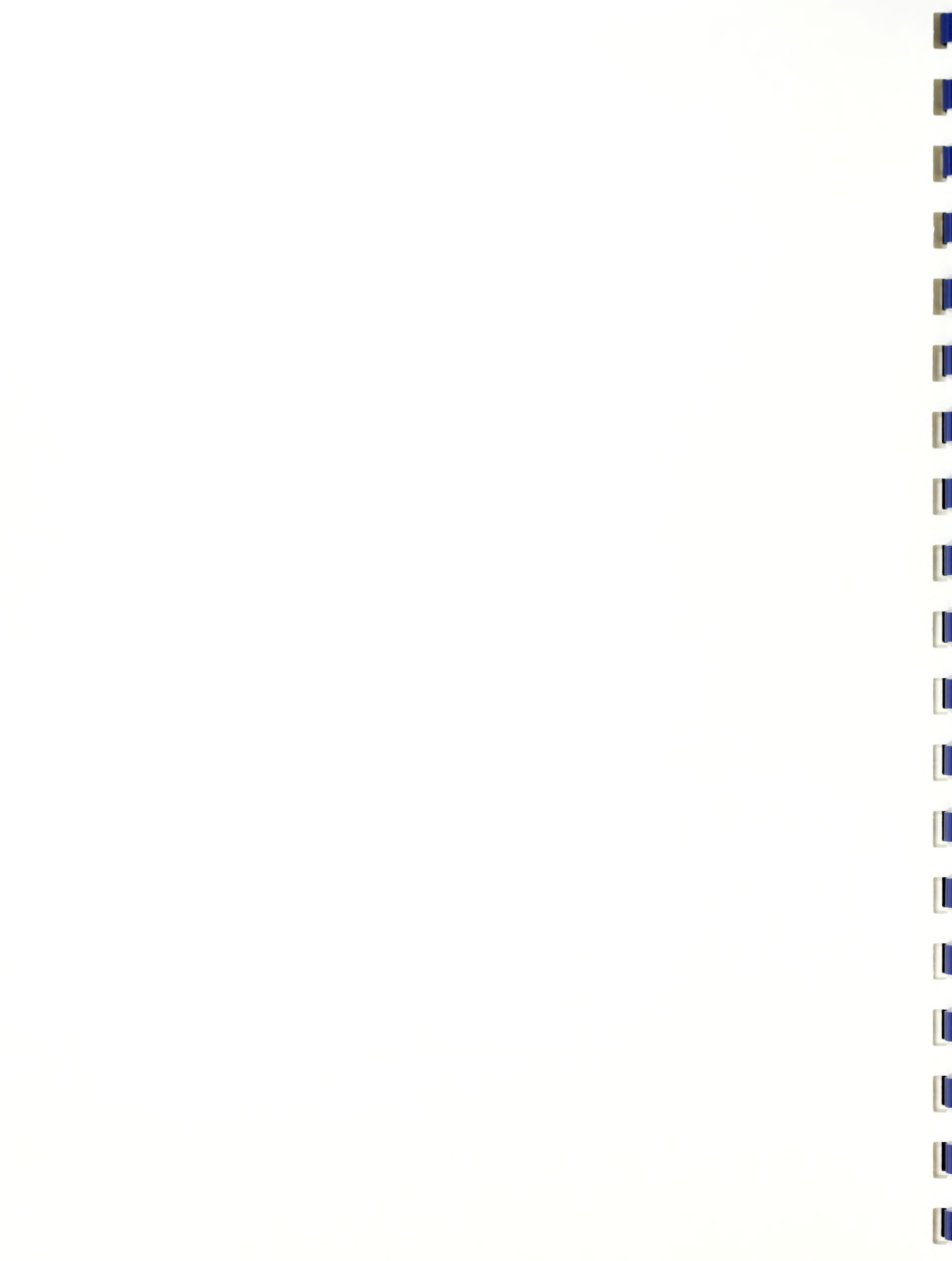
i

SECTION 1

EXECUTIVE SUMMARY

1.1   INTRODUCTION

The Montana SummitNet Executive Council (SEC) was appointed by Governor Racicot in 1995. Its purpose with respect to SummitNet, the State data network, was to provide policy level direction, financial planning, strategic planning, and guidelines on cost recovery, appropriate use and more.   Composed of representatives of various State agencies, local governments, the University system and others, the SEC determined early on that keeping up with the rapid changes occurring in the information and telecommunications industries, both in technology and regulation, was a demanding challenge.   In response, the SEC commissioned a plan, designed to be a living document, to help guide their actions and decisions.   This Comprehensive Telecommunications Plan is that document.

1.2   OBJECTIVES

The objectives of the telecommunications plan study may be summarized as:

- Survey current telecommunications infrastructure

- Identify key technology trends

- Understand principal community of interest needs and applications

- Consider the value of new regulatory and policy initiatives
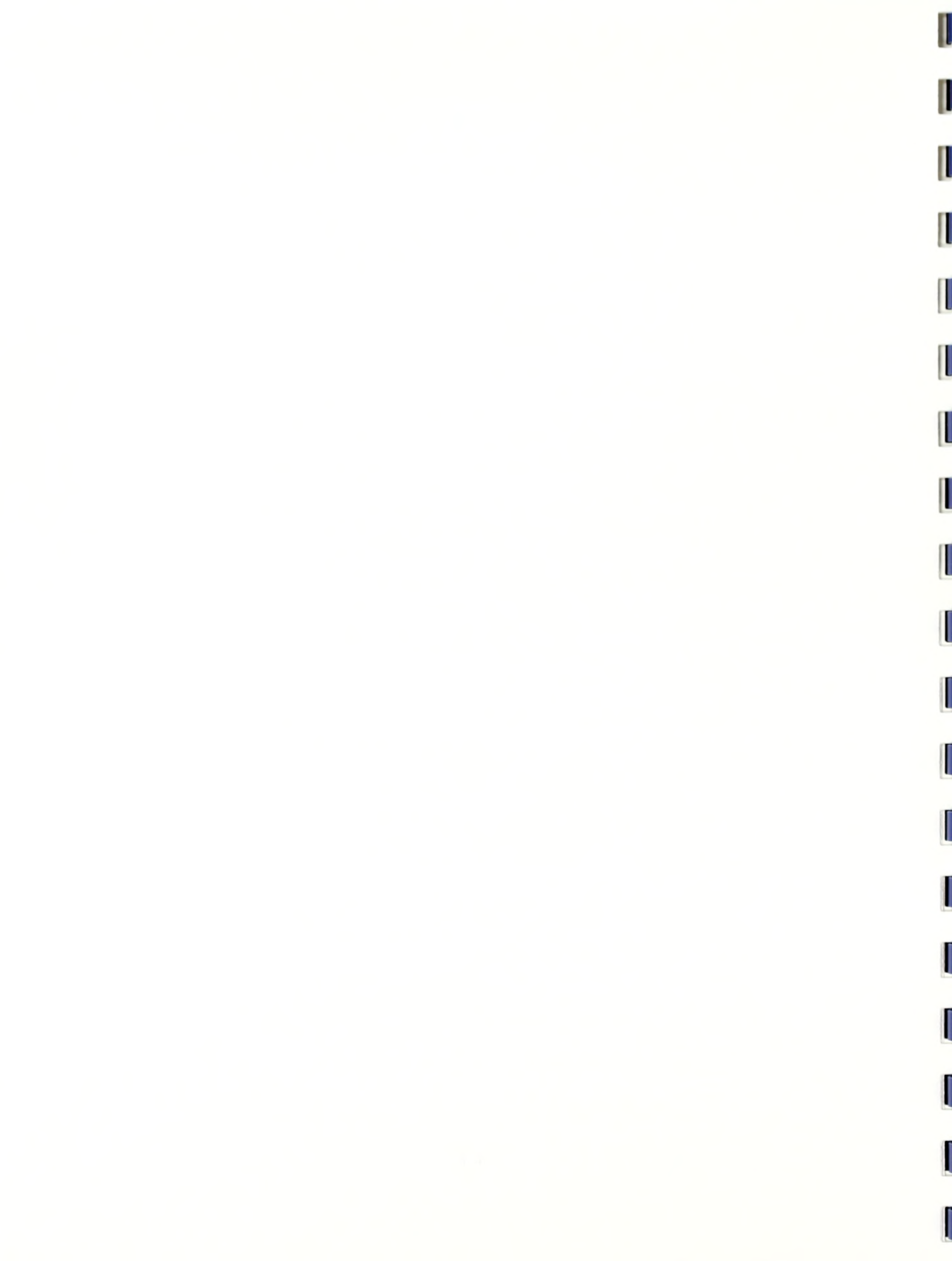
- Identify network impacts on economic development initiatives

- Prepare telecommunications strategies and recommendations

- Create processes for review, revision, and implementation of the strategies

- Recommend mechanisms for continuing dialog with communities of interest

- Inform public officials of telecommunications strategies and plans.

In addition to these objectives, a vision statement was developed as a broad "Statement of Project Objectives":

> **"To describe and recommend statewide telecommunication investments and standards which maximize access to advanced telecommunications for all Montana citizens, enhance economic development potential in Montana, and ensure that Montana fully participates in global networking initiatives and in the Information Age.**
>
> **"As a major component, there will be a modern statewide telecommunications network, provided by the private sector to the greatest extent economically feasible, which optimizes the delivery of state government, education, and other public services."**

This statement, with SEC concurrence, enabled and enhanced the continuing collaboration among State, higher education, and industry participants, and paved the way for further support of the Comprehensive Telecommunications Plan study effort. Industry views are represented in SEC processes through participation in a SEC Industry subcommittee. Membership includes service providers such as US West, WTCI, Touch America, Montana Independent Telecommunications Systems, and the Montana Telecommunications Association.
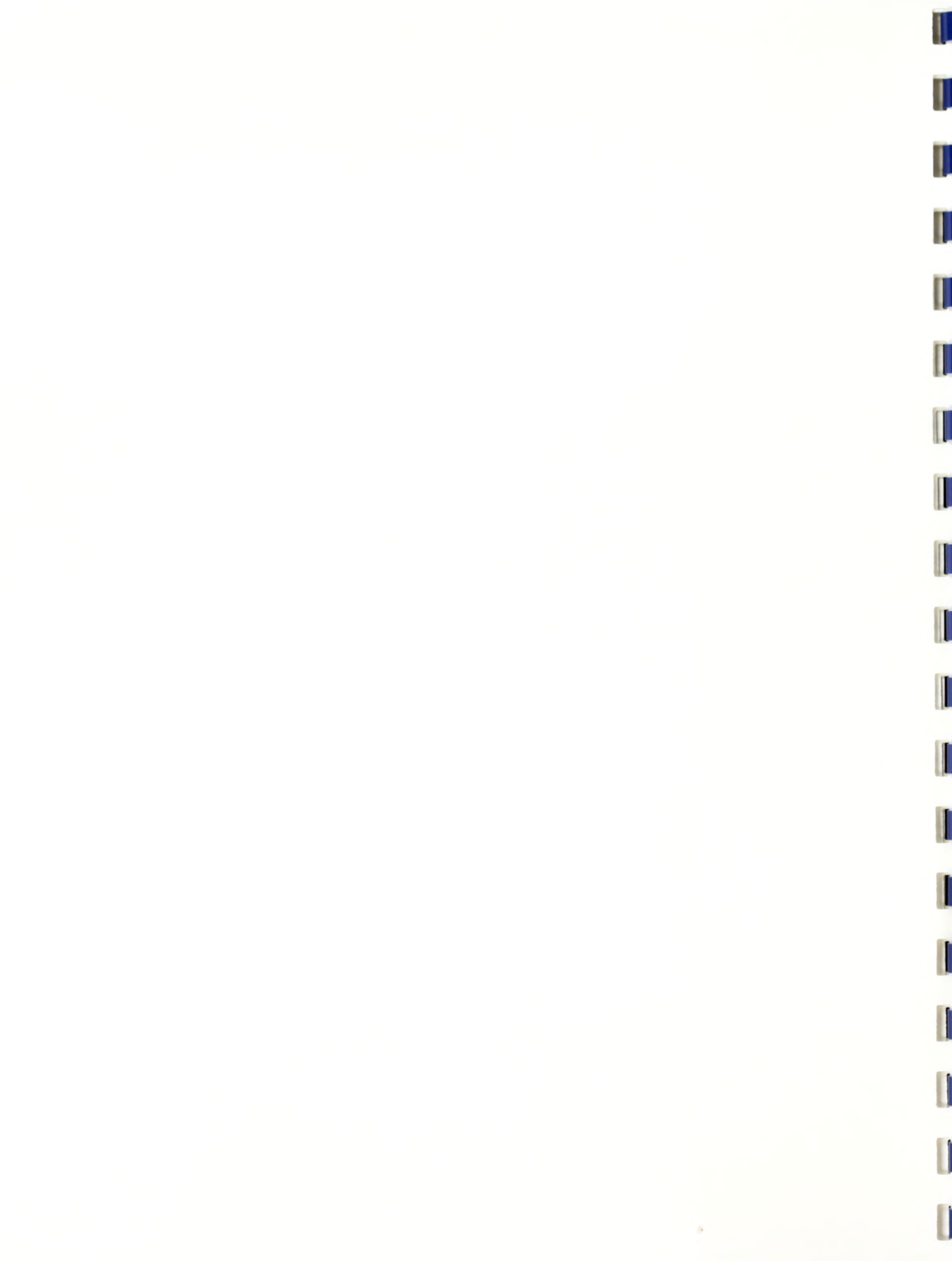
1.3 PROCESS

The process that guided the planning process is shown in the flow chart of Exhibit 1-1. The data gathering effort is the most time consuming, but also the most critical part of the overall process. In Montana, there were four distinct areas where input was required: users, infrastructure, economic development, and regulatory activity. Once sufficient data and information had been collected, these were analyzed in order to determine critical needs. Alternatives were then formulated and evaluated, conclusions were drawn, and recommendations were made.

1.4 NEEDS ASSESSMENT

The users and potential users of the State networks are the best source of information on the types of applications, growth rates, and other anticipated changes that could affect the volumes of traffic which the network is expected to carry. Obtaining this information is a critical first step to designing an optimal network for the future. To this end, the study team conducted interviews and focus groups across the State of Montana to afford representative members of a wide cross-section of communities of interest to voice their views.

Over a seven week period, more than sixty selected interviews were conducted across Montana with approximately 150 participants. Excellent turnouts were also achieved at eleven focus groups, averaging 19 participants per location. In total, 209 individuals participated, representing a wide and representative cross-section of the various communities of interest. In all, the data gathering teams traveled some 2,500 miles (see Exhibit 1-2) during July 1998.
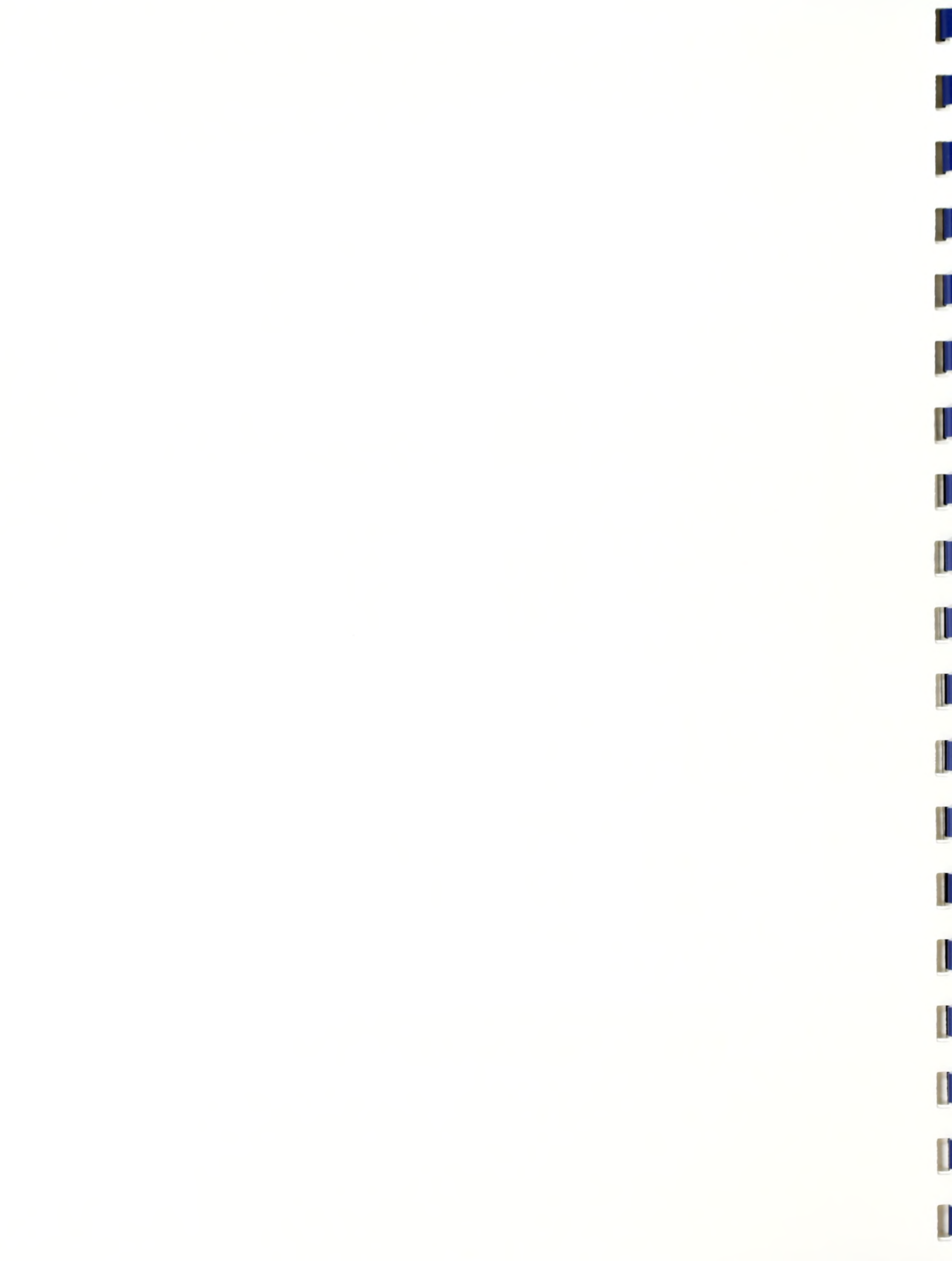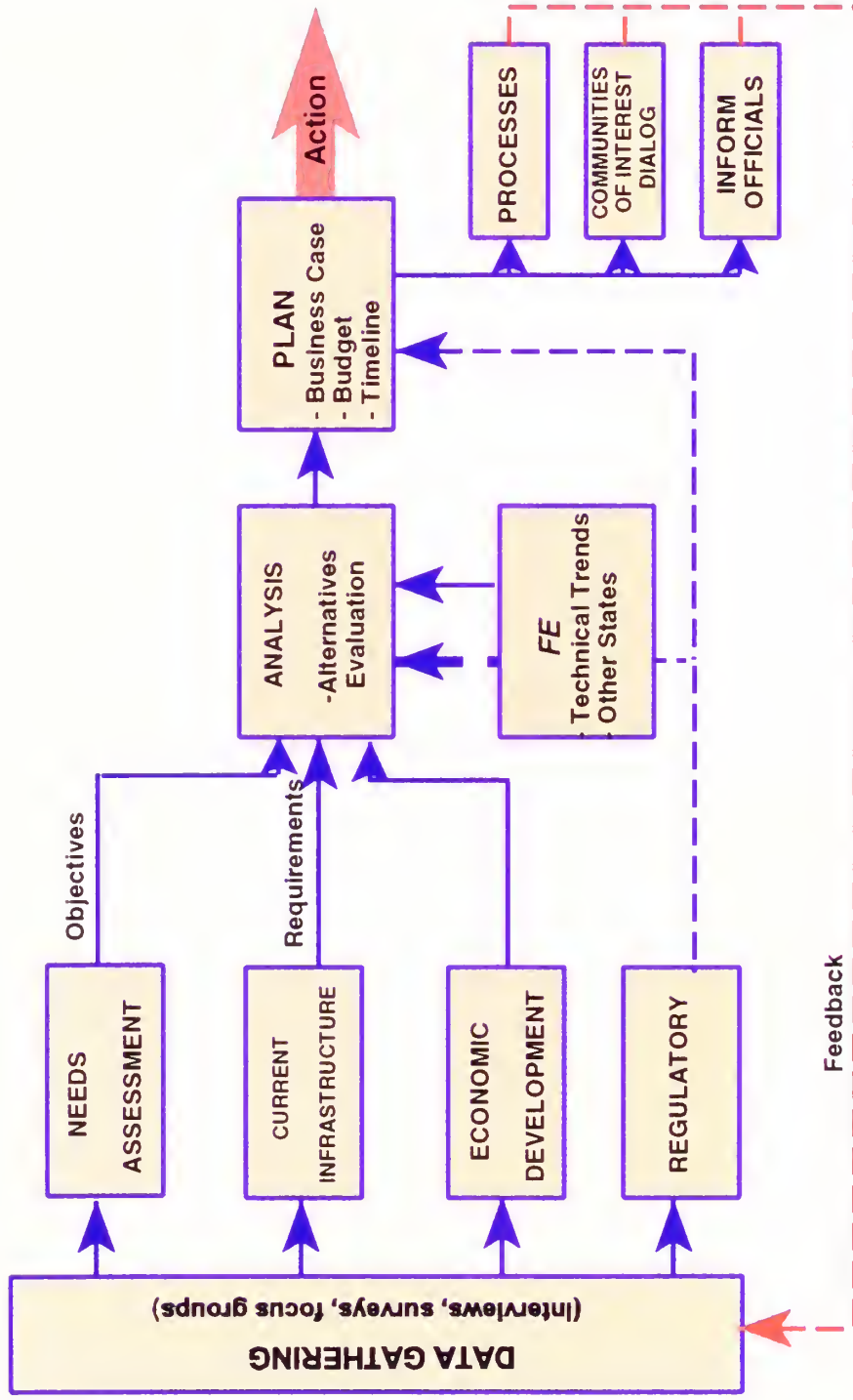
Exhibit 1-1. TELECOM PLAN DEVELOPMENT PROCESS
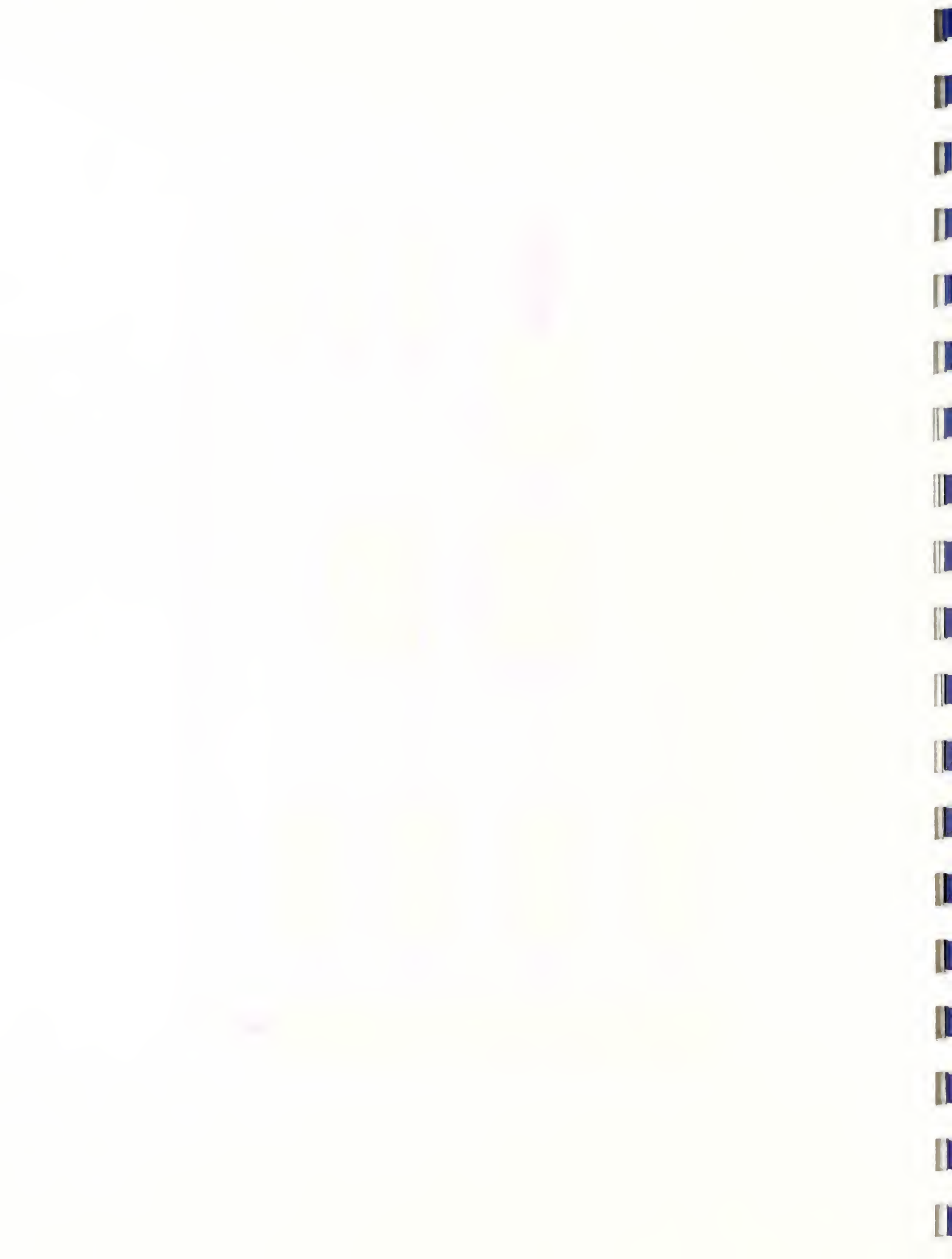
Exhibit 1-2. FOCUS GROUP ITINERARY
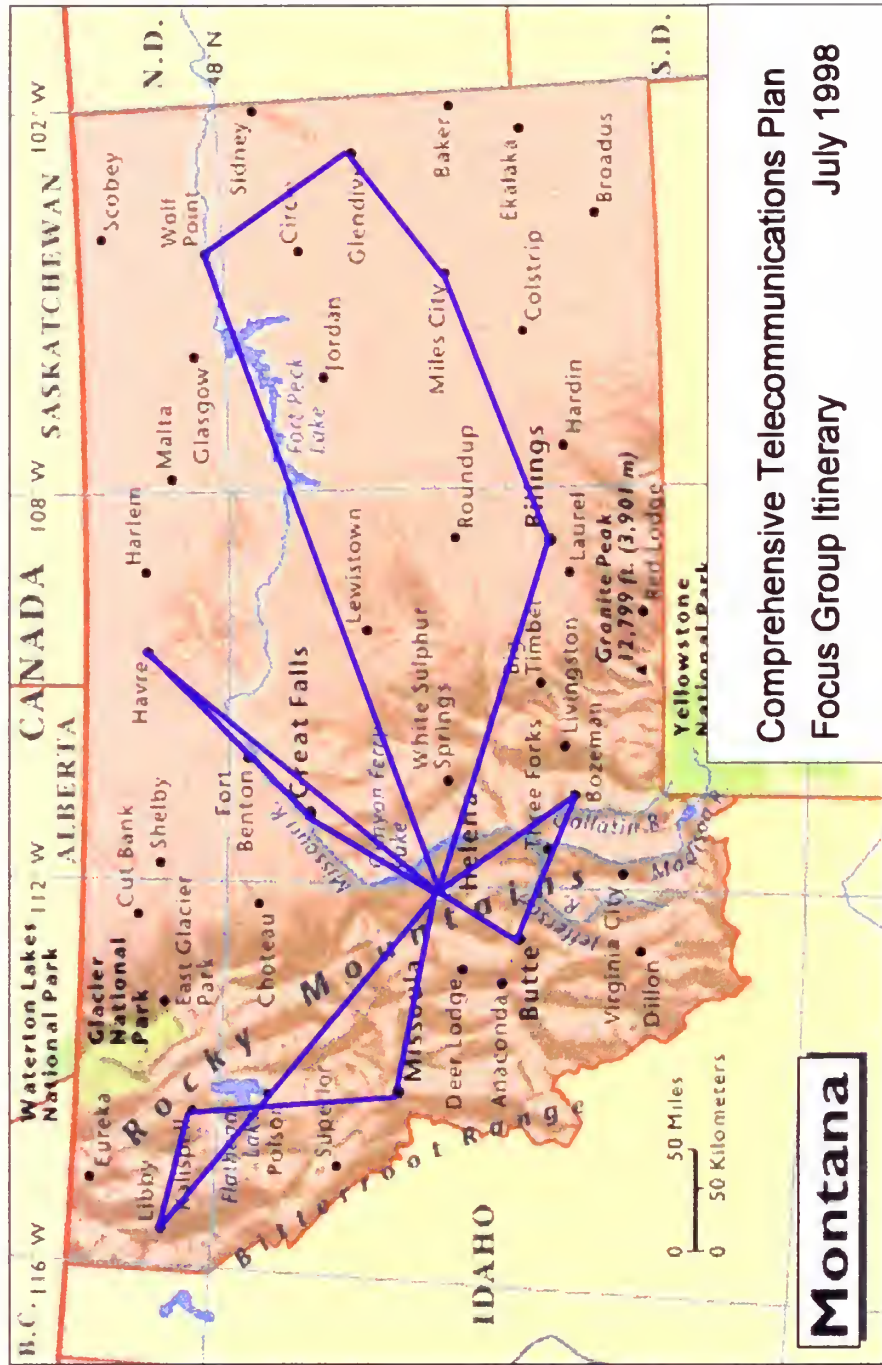
Comprehensive Telecommunications Plan   July 1998

Focus Group Itinerary

Montana
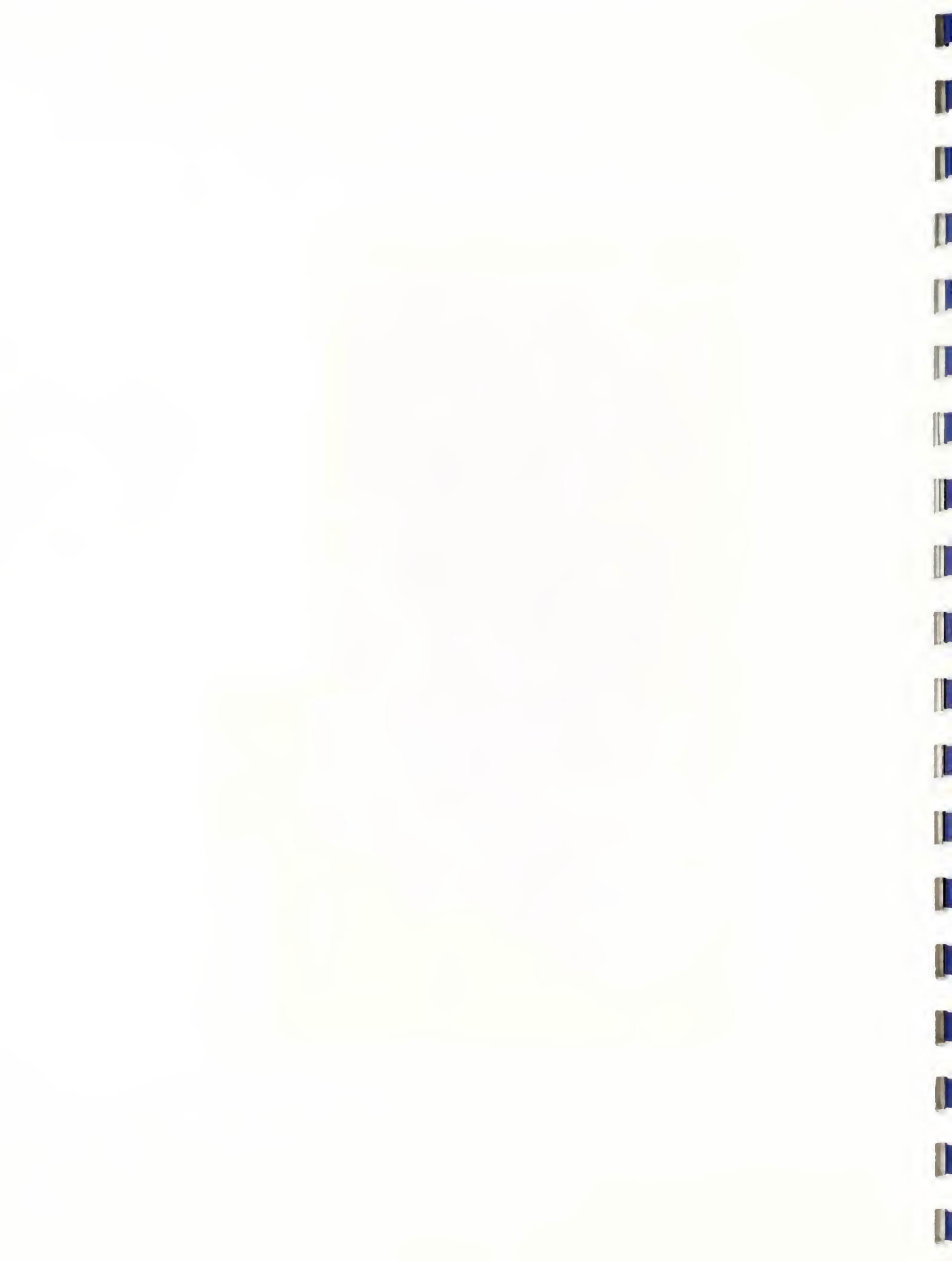
1.5   UNMET USER NEEDS

1.5.1   Needs Based on Interviews

Exhibit 1-3 outlines the most frequently identified issues, barriers and needs, as summarized from the user interviews. Selected needs areas are discussed below.

1.5.1.1   High Costs

High costs were principally manifested as the "backhaul problem." The most rural users pay the highest backhaul costs to obtain access to SummitNet, the State data network. This phenomenon applies to State agencies, as well as those schools, libraries, and local governments which would most benefit from networking, but which cannot afford the high backhaul cost of connecting to SummitNet. Monthly backhaul costs range from $70 to almost $600 per site, exclusive of the costs of connecting to SummitNet. Backhaul costs for K-12 schools and other non-agency users also tend to be higher because pricing is based on actual costs for each individual user, whereas, State agency prices are based on costs averaged across all State user agencies.

1.5.1.2   Bandwidth

Most agency representatives expressed concerns that SummitNet may not be able to accommodate the very large bandwidth demands which will be placed on it in the next few years. New applications, *e.g.*, POINTS, Virtual Pavilion, MTPRRIME, CJIN2, and others, tend to require huge bandwidths compared with earlier applications. Imaging and complex graphics are in ever increasing demand, and the productivity of the users of all applications benefits from quick response times.
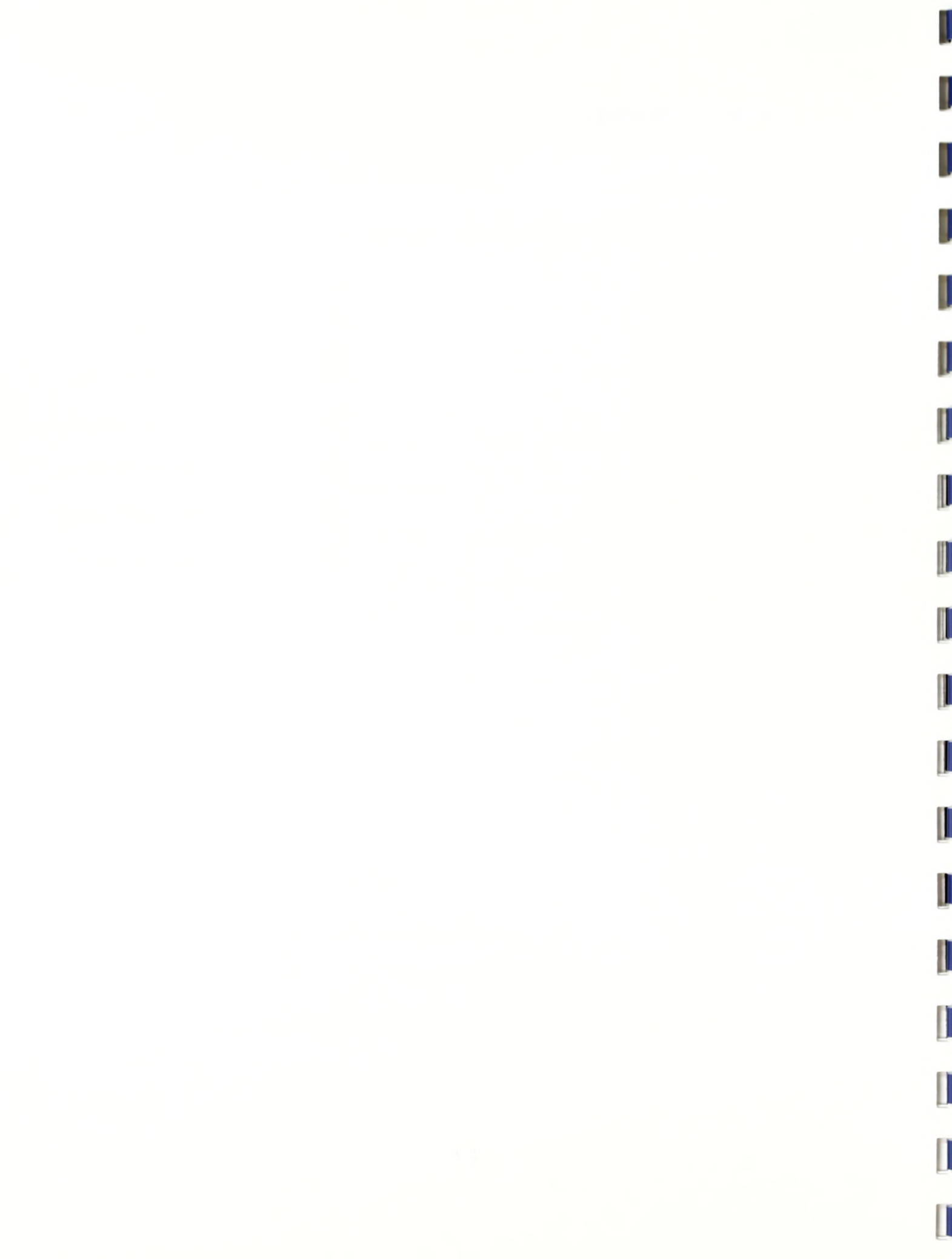
Exhibit 1-3. INTERVIEW BASED USER NEEDS

- Frequently cited SummitNet issues

    - Affordable universal Internet access is critical
    - High cost of rural services and backhaul
    - Limited awareness of benefits of SummitNet
    - Share access to SummitNet to lower user costs
    - Lack of e-mail, news groups, and other Internet basics
    - Prepare for bandwidth growth and network security

- Other recurring themes

    - Unmet need for technical support and training
    - Broaden State and federal cost subsidization
    - Lower the 12% property tax on telcos
    - Need for cost effective video conferencing and telecommuting
    - Integrate multiple video networks and allow non-State use
    - Eliminate LATA boundaries
    - Insufficient user agency staff and funding

- Other noted issues

    - Perceived need for dedicated Higher Education networks
    - State needs to gain the trust of local governments to lead effectively
    - Objections to the State as a network owner

1.5.1.3   Video

Interactive video distance learning in Montana is represented by three major video networks: METNET, VisionNet, and the Mid-Rivers and Range Distance Learning Network (Mid-Rivers Video). METNET is the State provided distance learning video system. VisionNet is an interactive video network owned and provided by a private consortium of independent telephone companies. The five independent companies include: Nemont, Triangle, Northern, Three Rivers, and Blackfoot. Mid-Rivers Video was the first interactive video network in Montana, and was developed by the Mid-Rivers telephone company. Mid-Rivers and Range operate the network principally in eastern Montana.

The incompatibility of these distance learning video networks was often mentioned by potential users as limiting opportunities for greater use in Montana. On the other hand, there was also uniform praise for the successful interoperability of the METNET video system and the MHTA (Montana Healthcare Telecommunications Alliance) healthcare video networks. The MHTA video alliance includes:

- Eastern Montana Telemedicine Network (EMTN)

- Partners in Health Telemedicine Network (PHTN)

- Realizing Education And Community Health (REACH)

- VideoLink of *St. Peter's* Hospital, Helena.
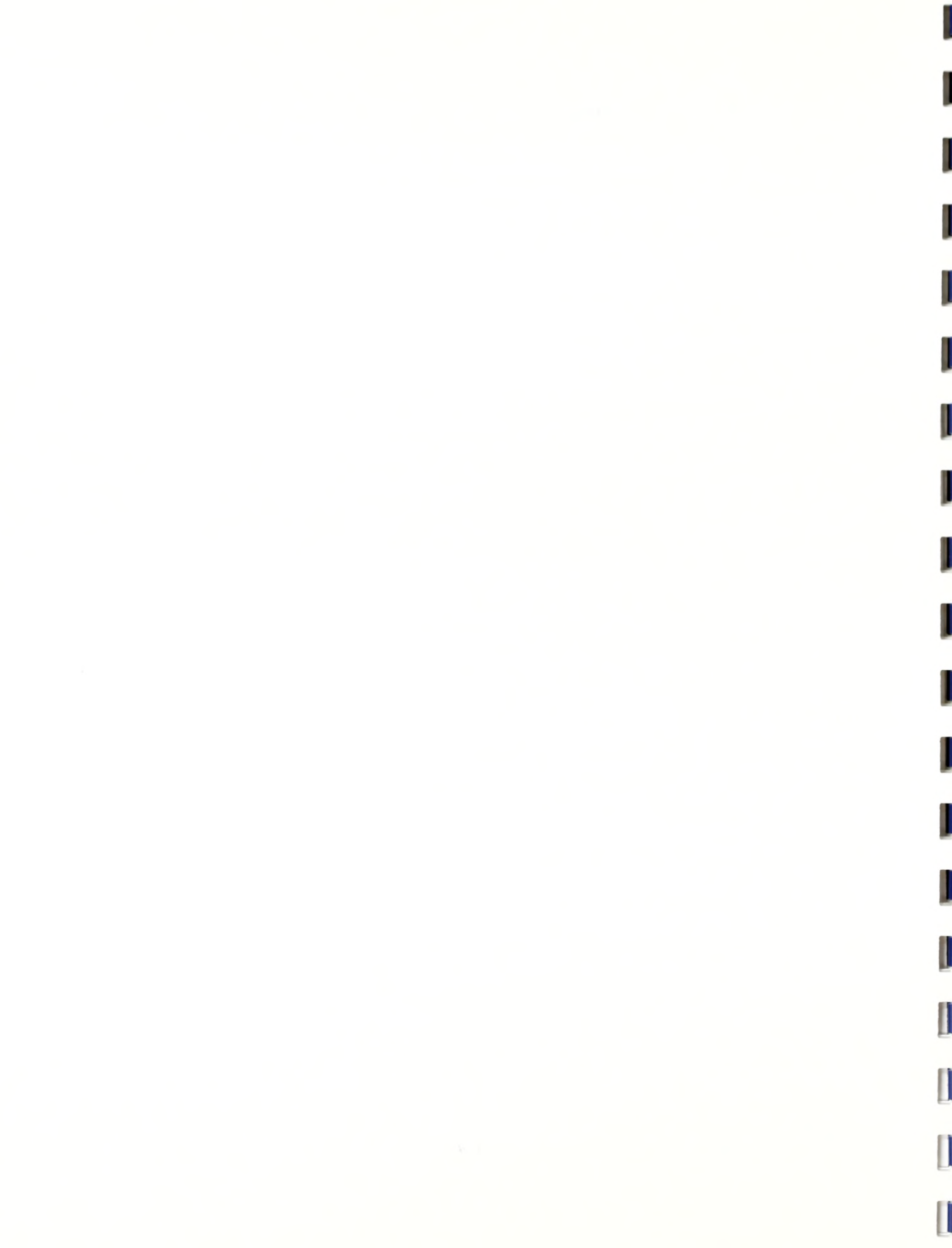
1.5.1.4　　　　Private Sector Sharing

Perhaps in response to the high costs of service, there were several suggestions to allow use of the State networks by the private sector. While this strategy was typically promoted as beneficial for economic development, some also recognized that it could also help to reduce costs and to help pay for network improvements. Such use was suggested by healthcare segments and some independent company video network proponents, for example. Access to SummitNet by small businesses, and access to METNET for business video conferencing use were promoted. Industry representatives, however, were critical of the use of State supported systems competing with private business.

1.5.1.5　　　　Internet Access

Internet access is essential if the State of Montana is to maintain parity with neighboring states and to compete successfully in economic development. K-12 schools, local government, and other non-State users constitute only about five percent of the present sites on the State's SummitNet data network. Other non-State users who have Internet access have found access arrangements via local Internet Service Providers to be more favorable.

Over and above the costs for backhaul and the cost of Internet access, users cited the lack of many of the common services typically provided by a private sector ISP. These services include E-mail, news services, chat groups, web page creation and hosting services, and technical support, among others.

1.5.1.6 Technical Support

Although many interviewees (*i.e.*, vendors, ISPs, higher education, State, telephone companies, etc.) claimed to provide technical support, this issue was the second greatest need expressed after cost, again principally from the more rural areas of the State. In some cases local computer literate high school students provided the greatest level of technical expertise available.

Similar to technical support, many organizations claimed to provide user training. Yet the lack of adequate training was another keynote sounded throughout the interviews, especially in rural areas.

1.5.2 Needs as Derived from Focus Groups

Exhibit 1-4 provides a brief summary of the issues, barriers, and needs as derived from the focus group sessions. This series of town meetings was divided into three sections, based on the presumption that dissimilar demographics would lead to dissimilar needs. The eastern section represented the most rural area where distance is a significant factor; the central section tends to be more urban; and the western section is the most rapidly growing and mountainous area. As the chart illustrates, these demographic differences have little influence on most of the barriers and needs that were expressed. Thus most areas of the State share the same basic concerns and needs.

1.5.2.1 Barriers

Video incompatibility was a surprisingly strong issue in the focus groups, particularly in the eastern half of the State. In most discussions the incompatibility was perceived as a political

Exhibit 1-4. FOCUS GROUP SUMMARY

Focus Group Summary

	Eastern	Central	Western
Issues			
Urban technology *vs.* Rural communities	x		x
Distance	x		x
Community cooperation	x	x	x
Barriers			
Video Incompatible	x	x	x
Bandwidth/access limited	x	x	x
High cost	x	x	x
Wireless technology	*x*	*x*	*x*
Needs			
Funding	x	x	x
Technical support	x	x	x
Training	x		x
Education/Distance Learning	x	x	
Economic Development		x	x
Video/SummitNet for Business Sector		x	x
Leadership & Direction	x	x	x

problem, rather than a technical one. Anyone familiar with video teleconferencing systems recognizes the inherent inefficiency and high cost when multiple video rooms sit side by side and yet cannot interconnect. In a state with limited technical resources, and with the need to cooperate locally, it is clear that the existing video networks are costly and inefficient.

Wireless technology is uniquely identified in Exhibit 1-4, not because it is a barrier, but rather because it is an evolving response to the barriers of high cost and limited access. Several wireless arrangements, although proprietary in nature and therefore neither scalable nor interoperable, provide examples of community cooperation, as well as an indicator of the strength of the need for access, coupled with the intense frustration in acquiring it.

1.5.2.2   Focus Group Needs

One natural response to high cost is to seek funding assistance in the form of grants, subsidies, and loans. Technical support and a call for more leadership and direction from the State also ranked high on the list of needs expressed by participants in all regions. Leadership and direction were often prompted by the need for compatibility and standards in networking. Even the need for technical support and training would be facilitated if standards and guidelines were available to help local managers make more knowledgeable decisions when purchasing telecom systems, maintenance, and training.

1.6   GOALS BASED ON NEEDS

The most critical user needs have the greatest bearing on the future direction of State

networks. But before we can prescribe where State networks should be headed, we need to fully understand the directions in which the telecom industry, technology, and information services are headed, both nationally and in the State of Montana.

1.6.1 Strategic Technology Directions

Three technology trends need to be understood as we consider the future directions for the State networks in Montana. These include the future of voice telephony, personal computers, and high capacity backbone network technologies.

- Voice Bandwidth Evolution. Some believe voice bandwidth compression is the most significant telecom event to occur since the invention of the telephone. This powerful tool may lead to the eventual replacement of the switched public telephone network with a digital packet/cell based network that is fully capable of transporting voice, video, and data at low cost. This technology suggests that today's typical 64 Kbps voice channel will soon handle as many as 40 compressed voice paths. This also suggests significant potential available capacity on existing voice networks, or alternatively, the transfer of voice to existing data networks

- Personal Computers. Most readers are fully aware of the dramatic power of personal computers and their low cost. Today a 450 MHZ Pentium II with 10 gigabytes of hard disk storage can be purchased for $1800. Soon, "near field" technologies will be available that achieve orders of magnitude increases in storage. Nevertheless, modern applications continue to consume these speeds and capacities as soon as they are developed and deployed. There can be little doubt that high speed data access will one day become the norm to every user location and household, just as the analog telephone loop is today

- High Capacity Backbone Network Technology. ATM (asynchronous transfer mode) switching is a cell based switching technology designed around SONET high capacity transport systems. This technology is costly because it was developed to be the ultimate in broadband switching technology. It can very capably mesh voice, data, and video services together on limited transport capacity, starting at the OC-3 level. Frame relay is far less sophisticated, but also much less expensive; it has been effectively developing many of the same capabilities as ATM, but at much lower cost. Unless or until these cost differences narrow considerably, frame relay will be the

technology of choice for most small to mid-sized networks

1.6.2 <u>The Internet</u>

The Internet is a complex series of interconnected computer networks forming a widespread information infrastructure commonly described as a network of networks. Such networks are connected in a manner which permits each computer in any network to communicate with computers on any other network in the system by using the non-proprietary Internet protocol ("IP"), which is simply a commonly understood set of rules for exchanging data.

Spiraling growth is one of the hallmarks of the Internet. In 1998, the number of computers using the Internet exceeded 100 million, and traffic on the Internet has been doubling about every 200 days. This expansion is driving dramatic increases in computer, software, services, and communications investments. The Internet has the potential to eliminate many geographic, political, and commercial boundaries.

The Internet is distinguished by five salient characteristics that are of general interest.

- The rapidly developing array of Internet and other interactive computer services available to individual Americans represents an extraordinary advance in the availability of educational and informational resources to residents

- These services offer users a great degree of control over the information that they receive, as well as the potential for even greater control in the future

- The Internet and other interactive computer services offer a forum for a true diversity of political discourse, unique opportunities for cultural development, and myriad avenues for intellectual activity

1-14

- The Internet and other interactive computer services have flourished with (and many people believe, because of) a minimum of government regulation

- Increasingly, Americans are relying on interactive media for a variety of political, educational, cultural, and entertainment services.

Of particular interest to Montanans:

- The availability of ubiquitous access to the Internet has the potential to substantially reduce or even eliminate the disadvantages that result from being located in remote areas away from business centers

- In addition, for rural Montana, Internet access will offer more educational opportunities typically only found in larger cities.

1.7   RECOMMENDATIONS

1.7.1   Strategic Direction

While the State of Montana's networks are already substantially consolidated, some have suggested separating the SummitNet backbone network into separate networks carrying State and higher education traffic. In *FE*'s professional opinion, such a decision would represent a move backwards at a time when most state networks are already consolidated, or are moving towards consolidation. *FE* is not aware of any state where consolidation has not been shown to be more economical than separate dedicated networks. The same can easily be shown to be true for Montana as well. In fact, we should emphasize that Montana has already taken the most crucial and difficult step by consolidating its voice/video and data backbone networks, to the envy of many other states.

In addition, the benefits of sharing of assets are also beginning to be recognized in previously restricted federal funding grants. It has become apparent to federal agencies that limiting

1-15

the use of federal funds can be costly, inefficient, and often at odds to the original intent of the grant. **FE** has successfully participated in negotiating payback arrangements to openly and legally share federally funded assets on a *pro rata* basis with non-federal applications.

More directly related to the needs, objectives, and goals of the general user community, analyses show that the strategic direction for telecommunications in the State of Montana can be defined by recommendations in a few selected areas. ***The greatest impact will be felt if the high costs of backhaul can be eliminated or significantly reduced, and universal Internet access can be made available equitably throughout the State. These two aspects are key to solving the State of Montana's telecom issues.*** Adoption of the recommendations may require a more open network design philosophy in order to meet the needs of an expanded user community.

1.7.2 <u>Rural Connectivity</u>

The largest issue confronting the future of telecommunications for the State of Montana is the issue of backhaul charges from rural locations to access services and applications on SummitNet. These costs are simply unaffordable in the absence of meaningful competition in Montana. In addition, the current State networks do not reflect the infrastructures of new and emerging service providers.

The greatest economies will result from extending the frame relay "cloud" outward from the ten existing frame relay switch locations, ideally to all county seats in the State.

1. Recommendation: Issue a Network Request for Proposal for a statewide multiyear competitive procurement to extend frame relay services to county seats in Montana, virtually eliminating separately billed backhaul costs.

With this extended approach, all frame relay concentration of end user facilities, whether for a State agency, education, library, or local government, will occur at the county seat "central office." All backhaul costs will be aggregated by the selected service provider(s) and included in a single monthly rate for each category of speed/bandwidth category offered. This price will be the same regardless of location, so that costs are effectively shared over as broad a user base as possible.

As a result, costs for SummitNet use can be reduced because:

- Facilities concentrated at county seats share transport facilities that connect to the frame relay cloud(s)

- A potentially huge increase of users is anticipated, including K-12 schools, libraries, and local governments

- Bandwidth requirements of State agencies will also grow considerably over time

- The anticipated consolidation of State agency voice and video onto the SummitNet data configuration using voice/video over frame relay/IP technologies will increase usage even more

- Transport service providers will be able to cost justify the introduction of new and more cost effective technologies

- Competition among the transport service providers within Montana is expected to increase

- There will be a greater likelihood of consortiums and partnerships among potential bidders.

Although frame relay is projected as the most likely technology to be procured,

alternative technologies within the "clouds" may be selected by the successful vendors. As a result, ATM, satellite, or other technologies may be included in the final configuration of the State transport network.

Clustering of users onto concentrated facilities is another aspect of this recommendation. As noted, separate facilities for K-12 schools, libraries, and other non-State agency users have been implemented to reach the present frame relay clouds. In addition, even among State agencies, separate facilities have often been deployed, even to serve multiple agency locations within the same city or town. Clustering of requirements onto common connections to the SummitNet frame relay cloud is a much more efficient and cost effective solution.

1.7.3   Internet Access Services

The second most critical need expressed throughout our contacts with Montanans was the issue of universal access to Internet services. Not only was backhaul cost seen as prohibitively expensive, but high Internet costs, as well as lack of a full compliment of Internet services and the lack of meaningful technical support were also prominent telecom issues. These needs are addressed in the second major telecommunications plan recommendation:

2. Recommendation: Issue a Network Request for Proposal (RFP) for a statewide multiyear competitive procurement for a full suite of Internet services tailored to State, higher education, K-12, libraries, and local governments at a uniform rate for all users. Limited access to SummitNet may be considered . A single contact point for technical support is required.

As envisioned, the Rural Internet/Intranet concept behind this RFP suggests that the entire State's business be awarded to a single provider, which may be a consortium of ISPs. The user market would include existing State agencies (forming a guaranteed base), as well as K-12 schools, libraries, and local governments.

A postalized rate approach is preferred, in which each user pays the same rate regardless of location. This price would include unlimited usage in several classes of service. Basic services might include high speed Internet access and dial-up Internet access.

As part of the recommended RFP, the State may offer the successful provider limited use of the SummitNet data transport network, with access optionally available at every county seat across the State. Use of the State data network would be limited to State agency, higher education, school, library, and local government traffic. Separate transport facilities would thus be needed by the ISP to carry private sector traffic. This recommendation would help move towards a number of the Governor's Blue Ribbon Committee recommendations suggesting universal Internet access as a vital component of advanced telecom for all Montanans. Clearly, the successful bidder would enjoy access on favorable terms to a significant portion of the State's population as a byproduct of this award.

The winning ISP should be a first tier Internet Service Provider whose network is based upon peering agreements with major national and international carriers via multiple high speed digital circuits to one or both of the nation's two major Internet traffic exchange facility locations,

MAE-West and MAE-East. The ISP should have (or be willing to install) points of presence in every Montana county for State designated traffic. The ISP may also elect to provide similar physical and service arrangements for customer access outside of this RFP. The ISP would be required to turn back Montana-to-Montana Internet traffic, thus avoiding feeding intrastate Internet traffic onto the already congested global network, while in effect creating a State intranet.

A technical staff should be available to help identify and implement the most appropriate access solution to fit the needs of each customer. ISP network engineers and consultants should be available to help design and configure each user's specific Internet access network, based upon each user's unique requirements and anticipated traffic. This will ensure optimal access performance for end users.

In summary, Montana's underserved Internet users need a single, reliable full service Internet Service Provider offering a full range of customer services and technical support at a fair and affordable price.

1.7.4   Interactive Video Networks

Montanans have repeatedly expressed concerns about the incompatibility of the three major distance learning networks: METNET, Mid-Rivers Video, and VisionNet. Assuming that the political barriers can be overcome, the technical problems hindering interoperability are believed to be solvable. The following recommendation applies to video networks generally in Montana:

1-20

3. Recommendation: Issue an RFP for a technical consultant to develop solutions and recommendations to resolve technical control, scheduling, and operational issues which now impede interoperability among the major distance learning and telemedicine video networks.

Legalization of METNET use by the private sector would help validate or even generate video conferencing usage in the private sector. This would help economic development, help support more network use and revenues, and demonstrate a consistent service demand. Once this demand materializes, the State can step back and let competition occur.

4. Recommendation: Consider legalizing limited private sector use of METNET where no viable competition exists.

1.7.5   Economic Development

Serious consideration and discussion must be initiated regarding the use of statewide networks by the private sector for economic development purposes. Well defined guidelines must be developed which can be supported by the private sector, and in which the State's leverage as an anchor tenant encourages commercial demand for telecommunications services.

5. Recommendation: Consider allowing private sector access to SummitNet under restricted conditions when this is in the best interest of the State as a whole.

1.7.6   Right of Way

Rights of way along state roads have been available to utilities for several years. Interstate rights of way, however, are becoming a major issue as competitive fiber network

construction accelerates. Many states see opportunities for additional revenues and for cost savings as State telecommunications networks are considered. Montana can derive optimal benefit from the rights of way it owns or controls on its interstate roads, bridges, and tunnels.

> *6. __Recommendation:__ The State of Montana should exchange non-exclusive interstate rights of way for dark fibers (plus maintenance) dedicated to State use.*

FE recommends this approach because:

- It would offer equal opportunity to multiple competitors

- It could provide the lowest cost to both the carriers and the State

- It would encourage economic development

- It has been successfully applied in other states.

1.8   IMPLEMENTATION SUMMARY

This section summarizes additional recommendations which have been made in various sections of the Comprehensive Telecommunications Plan, and itemizes some of the major actions which can now be taken by the State.

1.8.1   Economic Development Actions

Economic development in the telecommunications area should be based on a commitment to meeting four goals:

- Inventory the telecommunications services already available in each community

- Prepare promotional brochures publicizing Montana's quality of life as well as the

1-22

abundant telecom services available

- Promote travel, tourism, and adventure in Montana via the Internet

- Implement the Technology Assistance Center concept in communities.

Recommended Action: ***Implement economic development goals that advance understanding and opportunities for telecommunications.***

Technical resources in Montana are in great demand. Not only must in-state personnel with strong technical skills be retained, but the number of four year computer graduates must be increased, and computer literacy must be encouraged in the State.

Recommended Action: ***Increase the number of four-year computer graduates. Encourage computer literacy in all high schools, colleges of technology, and universities.***

1.8.2   Regulatory Action Summary

In depth investigation of regulatory issues, coupled with input from users, has resulted in two significant recommendations:

Recommended Actions:

- ***Extend the Universal Access Program (UAP) utilizing existing funds. Uncouple UAP from the federal E-Rate program***

- ***The PSC should formally clarify the definition of "advanced telecommunications services" in SB89 to include affordable access to advanced telecom services, and Internet access in particular.***

1.8.3   Interim State Actions

Some additional actions which the State (ISD) can take without awaiting the

development of RFPs and the ensuing selections processes are included in this section.

Recommended Actions:

- *Continue efforts to consolidate and share networks as feasible*

- *Begin the aggregation of SummitNet user access*

- *Pilot test the implementation of voice/video over frame relay or IP technology. This is consistent with ISD's objective of offloading video signals from the State's PBX switches*

- *Expand and build on existing data network operations monitoring and surveillance system*

- *Establish a training plan for the education of basic LAN, wiring, computer, WAN, and Internet technologies for rural K-12 schools, local governments, and libraries*

- *Consider formalizing State ISD technical support beyond the router interface during the new user installation process*

- *Publicize State telecommunications services.*

Processes for the review, revision, and implementation of the strategies are considered in the telecommunications plan text. The text also includes recommended mechanisms for continuing dialog; *e.g.*, regularly scheduled field trips for State staff.

1.9 STAKEHOLDER FEEDBACK

This Comprehensive Telecommunications Plan for the State of Montana will be published. Paper documents and/or CD-ROM versions of the plan will be distributed to all SummitNet Executive Council members and principal stakeholders. The Executive Summary section

of the overall comprehensive plan is to receive a wider distribution, via the Internet, to reach:

- Principal State agency representatives

- Principal representatives of both State and non-state higher education institutions

- K-12 school districts

- Libraries

- County, city, and town governments.

Participants who were interviewed, as well as focus group participants, will also be advised of the availability of the plan.

1.10   SUMMARY

In addition to the extensive technical and applications knowledge that we have gained in the course of our visits to Big Sky country, we have also come to appreciate the tremendous spirit of Montana's people. Known for their independence, Montanans could not survive without a strong pioneering bent toward innovation and a practical can-do attitude. Montanans find a way to overcome formidable obstacles to attain the goals that are important to them. This attitude is key to the Treasure State's future, for it is clear that no one outside Montana has the means, the incentive, or the will to solve Montana's telecommunications problems so much as Montanans themselves. We are therefore confident that, working together, following the recommendations set forth in this Telecommunications Plan, Montanans will soon enjoy the benefits of full participation in the twenty-first century Information Age.

APPENDIX A

SUMMARY OF MAJOR RECOMMENDATIONS

1. *Issue a Network Request for Proposal for a statewide multiyear competitive procurement to extend frame relay services to county seats in Montana, virtually eliminating separately billed backhaul costs.*

2. *Issue a Network Request for Proposal (RFP) for a statewide multiyear competitive procurement for a full suite of Internet services tailored to State, higher education, K-12, libraries, and local governments at a uniform rate for all users. Limited access to SummitNet may be considered . A single contact point for technical support is required.*

3. *Issue an RFP for a technical consultant to develop solutions and recommendations to resolve technical control, scheduling, and operational issues which now impede interoperability among the major distance learning and telemedicine video networks.*

4. *Consider legalizing limited private sector use of METNET where no viable competition exists.*

5. *Consider allowing private access to SummitNet under restricted conditions when this is in the best interest of the State as a whole.*

6. *The State of Montana should exchange non-exclusive interstate rights of way for dark fibers (plus maintenance) dedicated to State use.*

APPENDIX B

ACRONYMS

ATM - Asynchronous Transfer Mode

CJIN - Criminal Justice Information Network

EMTN - Eastern Montana Telemedicine Network

FE - Federal Engineering, Inc.

FR - Frame Relay packet technology

IP - Internet Protocol

ISD - Information Services Division, Department of Administration, State of Montana

ISP - Internet Service Provider

K-12 - Kindergarten through high school

Kbps - Kilobits per second (Kilo=1,000)

LATA - Local Access and Transport Area

MAE - Internet traffic exchange facility location

METNET - Montana Educational Telecommunications Network

MHTA - Montana Healthcare Telecommunications Alliance

MT PRRIME - Montana's Project to Reengineer the Revenue and Information Management Environment

OC-3 - Optical Carrier - level 3

PHTN - Partners in Health Telemedicine Network

POINTS - Process Oriented Integration of Tax Systems

PSC - Public Service Commission

REACH - Realizing Education And Community Health

RFP - Request for Proposal

SEC - SummitNet Executive Council

SONET - Synchronous Optical Network

SummitNet - State and Universities of Montana Multi-Protocol Network